


PRE-APPEAL BRIEF REQUEST FOR REVIEW		Docket Number (Optional) 112857-0412	
I hereby certify that this correspondence is being deposited with the United States Postal Service with sufficient postage as first class mail in an envelope addressed to "Mail Stop AF, Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450" [37 CFR 1.8(a)] on _____ Signature _____ Typed or printed name _____		Application Number 10/628,047 First Named Inventor Kato, et al. Art Unit 1798	Filed July 24, 2003 Examiner Tracy Mae Dove
Applicant requests review of the final rejection in the above-identified application. No amendments are being filed with this request. This request is being filed with a notice of appeal. The review is requested for the reason(s) stated on the attached sheet(s). Note: No more than five (5) pages may be provided.			
I am the <input type="checkbox"/> applicant/inventor. <input type="checkbox"/> assignee of record of the entire interest. See 37 CFR 3.71. Statement under 37 CFR 3.73(b) is enclosed. (Form PTO/SB/96) <input type="checkbox"/> attorney or agent of record. Registration number _____ <input checked="" type="checkbox"/> attorney or agent acting under 37 CFR 1.34. Registration number if acting under 37 CFR 1.34 <u>46,541</u>		 _____ Signature Thomas C. Basso _____ Typed or printed name _____ 312-807-4310 _____ Telephone number _____ May 2, 2008 _____ Date	
NOTE: Signatures of all the inventors or assignees of record of the entire interest or their representative(s) are required. Submit multiple forms if more than one signature is required, see below*.			
<input type="checkbox"/> *Total of _____ forms are submitted.			

This collection of information is required by 35 U.S.C. 132. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.11, 1.14 and 41.6. This collection is estimated to take 12 minutes to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. SEND TO: Mail Stop AF, Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.

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IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Applicant: Kato, et al.
Appl. No.: 10/628,047
Conf. No.: 4039
Filed: July 24, 2003
Title: CATHODE AND BATTERY INCLUDING SAME
Art Unit: 1795
Examiner: Dove, Tracy Mae
Docket No.: 112857-412

Mail Stop Amendment
Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

PRE-APPEAL BRIEF REQUEST FOR REVIEW

Examiner:

This request is submitted in response to the Final Office Action dated January 2, 2008 and an Advisory Action dated April 17, 2008. This request is filed contemporaneously with a "Pre-Appeal Brief Request for Review" and a "Notice of Appeal."

Remarks begin on page 2 of this paper.

REMARKS

This Paper, Notice of Appeal, and Pre-Appeal Brief Request for Review are submitted in response to the rejection of the sole remaining Claim 1 as maintained in the Final Office Action dated January 2, 2008. Applicants assert that the Examiner's decision to maintain the rejection in the Advisory Action of April 17, 2008 rises to the level of clear error and makes the case proper for pre-appeal review.

Claims 1, 3, 9 and 11 are pending. Claims 1, 3, 9 and 11 were rejected under §103(a) as being unpatentable over U.S. Patent No. 6,632,566 ("Yamada") in view of U.S. Patent No. 5,631,100 ("Yoshino.") Independent claims 1 and 9 contain parallel language requiring a cathode mixture layer that contains a cathode active material and a binder including a styrene butadiene latex adhesive (hereinafter "SBR") and a thickener. The content of the SBR in the cathode mixture layer ranges from between about 2 wt% to about 4 wt%, and the content of the thickener in the cathode mixture layer ranges between about 0.5 wt% to about 2.5 wt%. The thickener is polyacrylic acid and the cathode active material is lithium iron phosphorous oxide (LiFePO_4) having an olivinic structure.

Yamada discloses a cathode containing the compound $\text{Li}_x\text{M}_y\text{PO}_4$ that has an olivinic structure. LiFePO_4 is specifically disclosed. Yamada states that any known suitable binder routinely used as a binder for positive electrode active material may be used but gives no further details or discussion. Experiment #1 does give a synthetic example, where 70% weight LiFePO_4 , 25% weight acetylene black, and 5% weight polyvinylidene fluoride (PVDF) as a binder were used to prepare a cathode. Col. 10, lns 9-15. Yamada does not teach a binder containing SBR and a polyacrylic acid thickener.

In order to supply the elements of the claims absent from Yamada, the Examiner asserted Yoshino discloses the proposed range of SBR and polyacrylic acid for the cathode mixture layer present in the instant claims. Yoshino discloses secondary batteries with a positive electrode of lithium containing composite oxides as cathode active material and a negative electrode of carbonaceous material as anode active material. At least one of the electrode active materials is dispersed in a binder and coated onto an electrode. Yoshino indicates no limitation to a particular binder, and suggests at least 12 different binders. SBR and PVDF are included in that list. The range of binder content is listed as from 0.1 to 20 parts by weight (pbw) of binder per 100 pbw of electrode active material, preferably 0.5 to 10 pbw of binder per 100 pbw of

electrode active material. Col. 7, lns. 6-9 and col. 7 ln. 62 to col. 8 ln. 4. When the binder is a water-soluble polymer like SBR, a thickener may be added in an amount between 2 to 60 pbw per 100 pbw of the binder. Yoshino lists nine examples of thickeners, including polyacrylic acid.

Calculations of ratios of binder and thickeners were reported correctly

The Patent Office's failure to recognize the difference in amounts present in the Yoshino as compared to the claimed invention rises to the level of clear error. As noted above and emphasized in the previous response to office action, the amounts of SBR and polyacrylic acid in the claimed invention are reported as weight percent of binder (or thickener) in the cathode active layer. In contrast, Yoshino does not report the amounts of binders and thickeners in the same manner.

In the Advisory Action issued on April 17, 2008, the Patent Office asserts that "pbw out of 100 pbw of *some material* is the same as weight percent" (emphasis added). As a general statement this is true. However, the term *some material* is a critical aspect that the Patent Office has failed to appreciate. The claimed invention reports the amount of both the binder and the thickener in percent weight *versus cathode mixture layer*. Yoshino reports pbw of binder versus active material, and pbw of thickener *versus binder*. Stated more generally, the claimed invention states %wt A v. C and %wt B v. C; therefore A and B are independent of each other and are only dependent on the amount of C. In contrast, Yoshino states pbw of A v. C and pbw of B v. A. The amount of B is dependent on the amount of A, which is dependent on the amount of C. Therefore, the pbw of thickener in Yoshino cannot be directly compared to the %wt thickener as claimed, and the values must be recalculated.

The Patent Office's misunderstanding of this interrelationship also led to the statement in the Advisory Action that "the Table provided by the Applicant is incorrect and shows miscalculation [sic] the amounts of PAA has to be lower than the SBR as demonstrated by Yoshino." That recalculation was conducted correctly, based on the dependency of thickener to binder to active material in Yoshino. The recalculation of the endpoints in claims 1 and 9 from %wt to the pbw values used in Yoshino are reproduced in Table I below. Specifically, column three is the result of column two divided by column one, i.e. the thickener (PAA) vs. the binder (SBR). That calculation is exactly how Yoshino describes the pbw of thickener – no miscalculation has been made.

<u>Endpoint Values of Claimed Invention</u>		<u>Conversion to Values as Used in Yoshino</u>	
%wt SBR	%wt PAA	pbw PAA v. 100 pbw SBR	pbw SBR v. 100 pbw active material
4	0.5	12.5	4.2
2	0.5	25	2.1
4	2.5	62.5	4.3
2	2.5	125	2.1

Claims 1 and 9 are not obvious in view of Yoshino and Yamada

As asserted in the previous Office Action, Yoshino and Yamada do not make obvious the claimed invention because claims 1 and 9 are not fully encompassed by that combination, and examples predicted to work based on that combination in fact fail in reality. Yoshino sets forth a very broad disclosure of binders and thickeners used in electrodes. In particular, the stated binder range is 0.1 to 20 pbw, preferably 0.5 to 10 pbw, and the thickener range is 2 to 60 pbw thickener **versus binder**. In contrast the claimed invention claims a very narrow range of a single binder, 2.1 to 4.3 pbw SBR, and a much different range of a single thickener 12.5-125 pbw of polyacrylic acid. Only a portion of these claimed ranges fall within Yoshino and a fair portion of the range falls outside of Yoshino. Furthermore, areas well within the range of Yoshino's preferred embodiment fail to give the desired cathode stability. Compare Examples 1-1, 1-2, 2-1 and 2-2 (claimed invention) against comparative examples 1-1, 1-2, and 2-1 (preferred embodiments of Yoshino).

Claims 3 and 11 are not obvious in view of Yamada and Yoshino

As noted in the previous response to Office Action, herein incorporated by reference, dependent claims 3 and 11 require the further limitation that the cathode mixture layer contains a carbon material as a conductive agent, wherein the carbon material ranges from about 5 wt% to about 12 wt% with respect to the total amount of cathode active material and carbon material. In the Advisory Action, the Patent Office disregarded claims 3 and 11 in reviewing the response, asserting that they "were not incorporated into independent claims and therefore were not construed as such." The Patent Office erred in not considering the additional limitations of dependent claims 3 and 11.

In Yamada the only support for adding carbon to the cathode mixture layer can be found at col. 10 lns. 11-12, where 25% weight acetylene black is added to LiFePO_4 with PVDF as a binder. In Yoshino, no discussion is present in the specification for including a conductive agent that is carbon in the cathode. In Example 1 of Yoshino, a cathode containing a lithium oxide and a pair of carbon agents is disclosed. However, first, that example contains PVDF as a binder with no thickener. Second, the binder is not greater than 2% weight of the cathode mixture layer ($2/(100+2.5+2.5+2)=1.87\%$). And third, the percent weight of carbon with respect to the total amount of cathode active material and carbon material is 4.76% ($5/105$), which is outside the claimed range of 5-12%. Consequently, the combination of Yoshino and Yamada fails to disclose a cathode mixture layer containing olivine LiFePO_4 , 2-4% by weight SBR, 0.5-2.5% by weight of polyacrylic acid, and a carbon material as a conducting agent in 5-12% by weight with respect to the cathode active material and the carbon material.

In light of the above, the Applicant respectfully submits that the rejections of claims 1, 3, 9, and 11 are improper and should be reversed. Accordingly, the Applicant respectfully requests that a timely Notice of Allowance be issued in this case. If any additional fees are due in connection with this application as a whole, the Commissioner is authorized to deduct such fees from deposit account no. 02-1818. If such a deduction is made, please indicate the attorney docket number (0112857-412) on the account statement.

Respectfully submitted,

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BY 

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Dated: May 2, 2008